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TITLE: HIGH FREQUENCY PLASMA DEVICE  
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ABSTRACT:

PURPOSE: To realize a high frequency plasma device capable of supplying high frequency to a rotating electrode with a simple structure.

CONSTITUTION: A plurality of cylindrical rotating blades 14 are mounted on the lower part of a rotating shaft 6. Between the rotating blades 14, a plurality of cylindrical fixed blades 15 are provided, and the fixed blades 15 are arranged concentrically to the center of each rotating blade 14. The fixed blades 15 are movable in the direction shown by the arrow in the drawing by a driving mechanism 16. The fixed blades 15 are connected to a high frequency power source 4 through a matching box 17. In such a constitution, the matching of impedance is conducted by regulating a variable capacitor in the matching box 16, linearly moving the fixed blades 15 to change the capacitance of the variable capacitor formed by the fixed blades 15 and the rotating blades 14.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to high frequency plasma equipments, such as high frequency plasma spatter equipment and an etching system.

[0002]

[Description of the Prior Art] Drawing 1 shows the conceptual diagram of conventional RF plasma equipment. 1 is a vacuum chamber, and after evacuation is carried out beforehand, inert gas, such as argon gas, is enclosed with the interior. In a chamber 1, the plate-like electrodes 2 and 3 of a pair counter, it is arranged, and the electrode 2 is grounded. The RF is supplied to the electrode 3 through the matching box 5 which performs impedance matching from RF generator 4.

*indicates vacuum means indicate gas inlet*

[0003] In such equipment, when the membranous ingredient matter is used as an electrode 3, using the substrate which should form the film in a front face as an electrode 2, equipment is used as a sputtering system. If the high frequency from RF generator 4 is impressed to an electrode 3 through a matching box 5, the high frequency plasma will occur among electrodes 2 and 3, consequently internal argon gas will be ionized. Argon ion collides toward an electrode 3 and carries out the spatter of the ingredient of an electrode 3. The front face of a substrate 2 adheres to the ingredient by which the spatter was carried out, and membrane formation of the ingredient of an electrode 3 is given to the front face of a substrate 2. In addition, if the substrate with which the desired mask was prepared as an electrode 3 is used, the equipment of drawing 1 will be used as an etching system of the substrate as an electrode 3.

[0004]

[Problem(s) to be Solved by the Invention] Now, with the above-mentioned equipment, since formation of the film on a substrate 2 is made uniform, the electrode 3 by which a spatter is carried out may be rotated. In this case, as shown in drawing 2, he forms a revolving shaft 6 in an electrode 3, and is trying to rotate a revolving shaft 6 by the rolling mechanism 7. And in order to supply the RF from a matching box 5 to an electrode 3, he forms two or more disc-like rotary wings 8 in the edge of a revolving shaft 6, and is trying to arrange this rotary wing 8 between the fixed wings 9 of the shape of two or more ring. This fixed wing 9 is connected to matching HOHOKKUSU 5. Consequently, capacity coupling of a matching box 5 and the electrode 3 is carried out by the capacitor which a rotary wing 8 and a fixed wing 9 form, and supply of a desired RF is performed to an electrode 3. The equal circuit of such RF plasma equipment is shown in drawing 3. In this equal circuit, a capacitor 10 is a capacitor which a rotary wing 8 and a fixed wing 9 form. Moreover, a matching box 5 consists of two sorts of variable capacitors 11 and 12, and an inductance 13. There are many capacitors, the components mark which constitute equipment increase, and cost rises so that clearly from this equal circuit.

[0005] This invention was made in view of such a point, and the purpose is in realizing the RF plasma equipment which can supply a RF to a rotating electrode with an easy configuration.

[0006]

[Means for Solving the Problem] The electrode of the pair which the high frequency plasma equipment based on this invention countered in the chamber, and has been arranged, In order to change the

electrostatic capacity of the capacitor by a means to rotate one electrode, the revolving shaft connected to the rotating electrode, the rotary wing prepared in the revolving shaft, the fixed wing which forms a capacitor between rotary wings, and a rotary wing and a fixed wing, It is arranged between the means for moving a fixed wing to an one direction linearly, an RF generator, and an RF generator and a fixed wing, and is characterized by having a matching box for performing impedance matching of the high frequency from an RF generator.

[0007]

[Function] The RF plasma equipment based on this invention supplies the RF from an RF generator to a fixed wing, and forms a capacitor by this fixed wing and the rotary wing rotated with a rotating electrode, and this capacitor is used for it as a variable capacitor by changing the location to the rotary wing of a fixed wing.

[0008]

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing. Drawing 4 shows the RF plasma equipment based on this invention, and, as for the same part as drawing 1 and the conventional equipment of drawing 2, the same number is attached. The greatest difference between this example, and drawing 1 and the conventional equipment of drawing 2 is a point constituted so that a fixed wing could move in the shape of a straight line to a rotary wing. In drawing 4, the rotary wing 14 of two or more shape of a cylinder rotated united with a revolving shaft is attached in the lower part of a revolving shaft 6. Two or more rotary wings 14 are arranged in the shape of a said alignment, respectively. Between this rotary wing 14, the fixed wing 15 of the shape of two or more cylinder is arranged, and these fixed wings 15 are also arranged in the shape of a said alignment around the core of each rotary wing 14, and the congruous cores. Drawing 5 is an A-A sectional view in drawing 4, and the cross section which shows the cross section of a rotary wing 14 and a fixed wing 15, and was shown as the continuous line showed by the rotary wing 14 and the dotted line is a fixed wing 15. This fixed wing 15 is made movable in the direction shown in the drawing Nakaya mark with a drive 16. This fixed wing 15 is connected to RF generator 4 through the matching box 17.

[0009] With such a configuration, although a capacitor is formed, since it is movable, a fixed wing 15 commits a rotary wing 14 and a fixed wing 15 as a variable capacitor to a fixed wing 14. Consequently, the equal circuit of this example comes to be shown in drawing 6. A variable capacitor 18 is a capacitor which a rotary wing 15 and a fixed wing 15 form in this equal circuit. When the equal circuit of this drawing 6 is compared with the equal circuit of drawing 3, it is that a capacitor 10 turns into a variable capacitor 18, a matching box 16 consists of a variable capacitor 12 and an inductance 13, and the variable capacitor 11 is omitted. That is, the capacitor 10 and variable capacitor 11 of an equal circuit of drawing 3 were able to turn into the single variable capacitor 18, and the variable capacitor 11 was able to be lost substantially. In addition, in adjusting an impedance, a fixed wing 15 is linearly moved with adjustment of the variable capacitor 12 in a matching box 16, and it carries out by changing the capacity of the variable capacitor 18 which a fixed wing 15 and a rotary wing 14 form. Although this invention was explained above, this invention is applicable to a high frequency sputtering system or a high frequency etching system.

[0010]

[Effect of the Invention] As explained above, the RF plasma equipment based on this invention supplies the RF from an RF generator to a fixed wing, forms a capacitor by this fixed wing and the rotary wing rotated with a rotating electrode, and since this capacitor was used for it as a variable capacitor by changing the location to the rotary wing of a fixed wing, it can supply a RF to a rotating electrode with an easy configuration.

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[Translation done.]

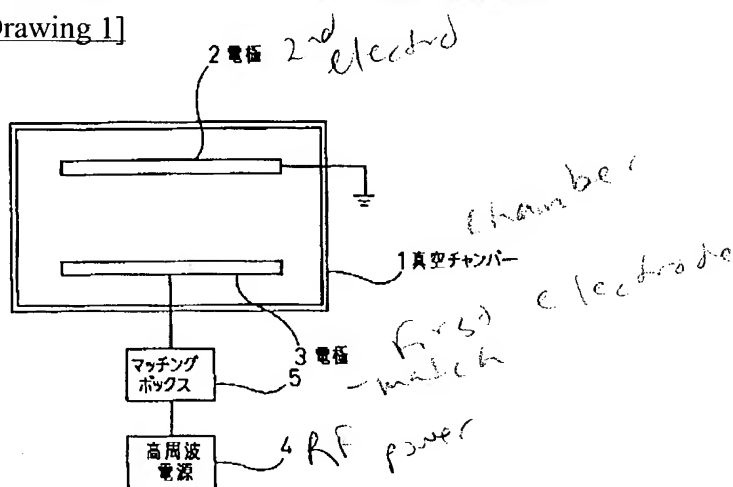
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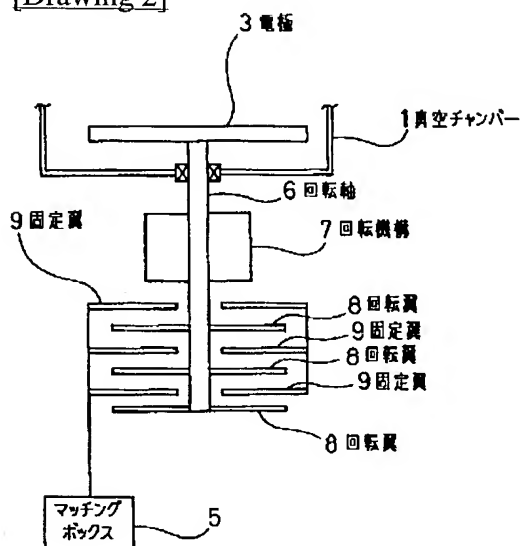
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## DRAWINGS

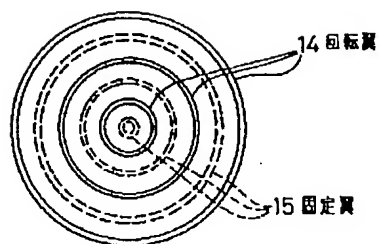
[Drawing 1]



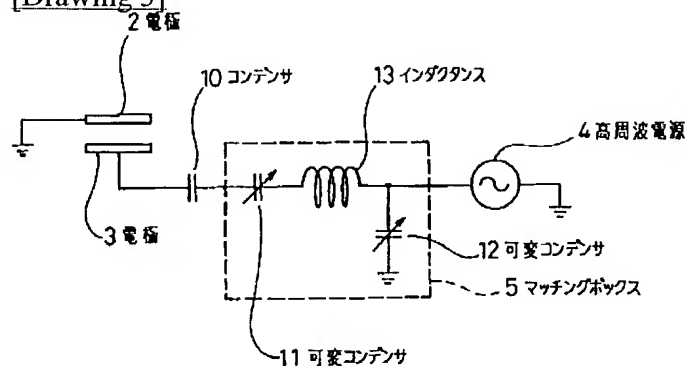
[Drawing 2]



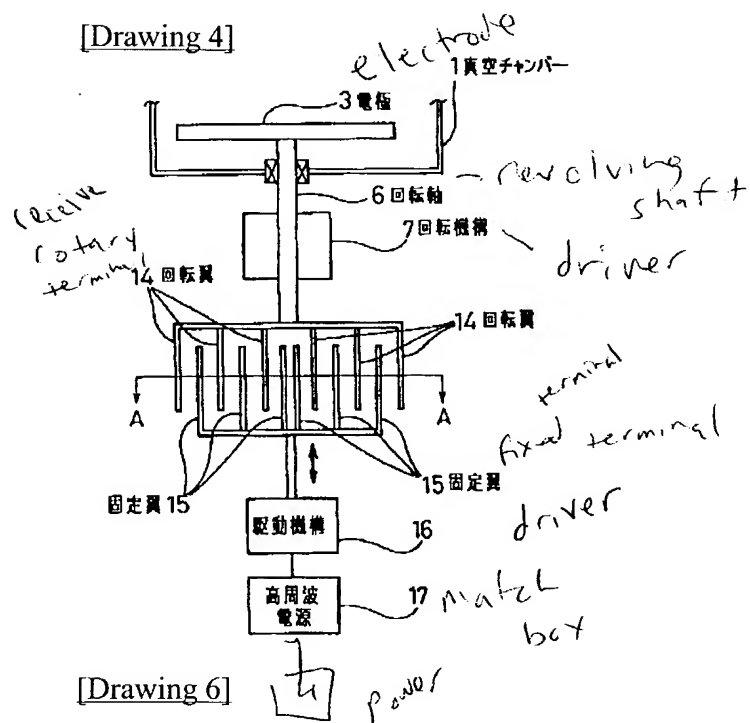
[Drawing 5]



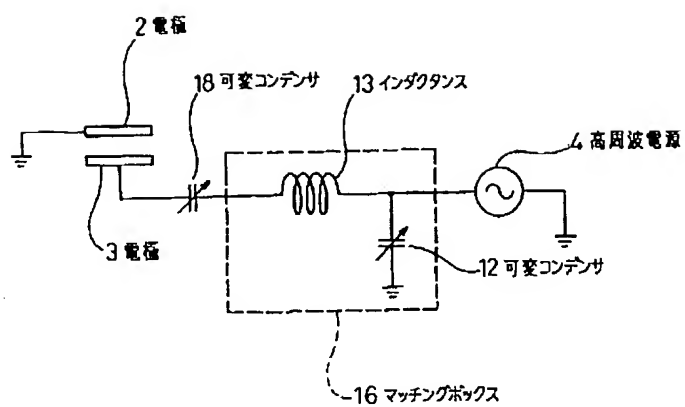
[Drawing 3]



[Drawing 4]



[Drawing 6]



[Translation done.]